**Genetics Problems: Sex-Linked Inheritance**

**Short Answer Question 1**

Haemophilia is inherited as an X-linked recessive disorder. A girl is haemophiliac.

1. What are the possible genotypes of her parents?
2. What are the corresponding phenotypes of her parents?
3. Assuming her mother was normal for blood clotting, what were the girls’ chances of being born with the trait?

**Short Answer Question 2**

A disease linked to a gene on the X chromosome is denoted by Xn while the non-diseased gene is denoted by XN. If a female child is born with the disease, determine the possible genotype of the father.

**Short Answer Question 3**

A disease linked to a gene on the X chromosome is denoted by Xh while the non-diseased gene is denoted by XH. If a female child is born with the disease, determine the possible genotype(s) of the father and the mother.

**Answers**

**Short Answer Question 1**

a. Girl must be XhXh

Therefore parents are: XHXh or XhXh and XhY

##### b. Father: haemophiliac

##### Mother: carrier (i.e. normal phenotype) or haemophiliac

c. Parents: XHXh x XhY

Genotypic Ratio: 1 XHXh : 1 XhXh : 1 XHY : 1XhY

BUT – already know she’s a girl, therefore only include 1 XHXh : 1 XhXh

Therefore, 50% chance of being a haemophiliac

**Short Answer Question 2**

Child must be XnXn. Must inherit an Xn from each parent, therefore father must be XnY.

**Short Answer Question 3**

Child must be XhXh. Has to inherit Xh from each parent.

Father must be XhY

Mother could be XHXh or XhXh